

WHAT IS CLAIMED IS:

1. A method for fabricating a film, the method comprising:
supplying electrical energy to a gas mixture of noble gas and reactant
gas at a total pressure of 90 kPa to 110 kPa to create reactive species, the reactive
5 species forming a film on a substrate.
2. The method of claim 1, said energy being supplied to the gas mixture
by electric power in a frequency range of 1 kHz to 100 MHz.
3. The method of claim 1, one of helium, argon, neon krypton, xenon or
one of a mixture of at least two chosen from a group consisting of helium, argon neon,
10 krypton and xenon being used as noble gas.
4. The method of claim 1, temperature of the substrate on which said film
is to be formed being in a range of 25 to 500°C.
5. The method of claim 1, the film being silicon dioxide or having a
composition close to silicon dioxide.
- 15 6. The method of claim 1, the film being silicon nitride or having a
composition close to silicon nitride.
7. The method of claim 1, the film being one of a silicon film, a doped
silicon film, and a hydrogenated-silicon film.
8. The method of claim 1, the film being one of a metal and an alloy film.
- 20 9. A semiconductor device comprising a film fabricated according to the
method of claim 1.
10. The semiconductor device of claim 9, the semiconductor device being
one of a metal oxide semiconductor field effect transistor device, a thin film transistor,
and a silicon on insulator device.
- 25 11. The semiconductor device of claim 9, the semiconductor device being
a photovoltaic device.
12. An electro-optical apparatus comprising the semiconductor device of
claim 9.
13. A memory device comprising a film fabricated according to the
30 method of claim 1.
14. The memory device of claim 13, the memory device being one of a
metal oxide semiconductor field effect transistor device, a thin film transistor, and a
silicon on insulator device.

15. The memory device of claim 13, the memory device being a photovoltaic device.

16. A method for fabricating a film, the method comprising:
supplying electrical energy to a gas mixture of noble gas and reactant
5 gas at a total pressure of 1 kPa to 110 kPa to create reactive species, the reactive
species forming a film on a substrate.

17. A method for fabricating a film, the method comprising:
supplying optical energy with a light of wavelength less than 200
nanometer to a mixture of noble gas and reactant gas to create reactive species, the
10 reactive species forming a film on a substrate.

18. A semiconductor device comprising a film fabricated according to the method of claim 17.

19. A memory device comprising a film fabricated according to the method of claim 17.

20. A method for fabricating a semiconductor device, the method comprising:

a step of forming a film by supplying electrical energy to a mixture of noble gas and reactant gas at a total pressure of 90 kPa to 110 kPa to create reactive species, the reactive species forming a film on a substrate.

21. A method for fabricating a memory device, the method comprising:
a step of forming a film by supplying electrical energy to a mixture of noble gas and reactant gas at a total pressure of 90 kPa to 110 kPa to create reactive species, the reactive species forming a film on a substrate.